an air flow path for cooling said inverters being provided between said photo-voltaic modules.

REMARKS

Claims 1-20 are rejected as being anticipated by or, in the alternative, obvious over, Haan, WCPEC, pages 925-928.

The present invention is directed to solving a problem which occurs when an inverter is mounted on a PV apparatus. When an inverter is directly mounted on the back surface of the PV module, heat is conducted from the PV module to the inverter and degrades the conversion efficiency of the inverter. In some cases, the inverter might be damaged. To solve this problem, the present invention provides various embodiments which mount inverters to PV modules, each embodiment provides measures which guard against the deleterious effects of the heat on the inverter.

Claim 1 sets forth that an inverter (2) is mounted on a surface opposite to the light receiving surface of the PV module, as shown in Fig. 1. The claim has been amended to make it clear that the inverter is mounted so as to provide a space S for air flow between the inverter and the PV back surface. With this construction, an inverter can effectively radiate the heat that it generates into the air flow path. As a result, the heat from the PV module is not conducted to the inverter.

Haan teaches a construction in which an AC module has an inverter mounted on a PV module. An embodiment of the mounting of the inverter is shown in Fig. 8, where an inverter is mounted directly on the back surface of the PV module and the inverter is encapsulated. This arrangement is designed to take into consideration the use of the apparatus under harsh environments (temperatures from -20°C to 80°C, relative humidity up to 100%).

Haan does not recognize the problem of inverter performance deterioration caused by heat from the PV. Haan clearly does not teach or suggest the particular mounting arrangement of claim 1 wherein there is an air flow space between the back surface of the PV and the inverter. Accordingly, claim 1, which describes novel and advantageous subject matter, is patentable over Haan and should be allowed.

Claims 3 and 4, which depend from claim 1, further describe an embodiment in which an inverter is mounted by using connectors as shown in Figs. 1 and 2. The connection of both connectors make it possible for inverter elements and PV elements to be connected electrically and also makes it possible to support the inverter with an air gap. This provides an apparatus which has good workability. The novel and advantageous features of these claims are clearly not shown or suggested in Haan. Therefore, these claims also are patentable.

Claims 5-7 are directed to an embodiment for mounting an inverter according to the arrangements shown in Figs. 3-8. Here, an inverter is mounted on a part of a frame and a slit for air inflow is provided on the frame in a position

outside of the location where the inverter is mounted. Accordingly, heat generated by the inverter itself can be radiated into the air flowing through the slit. The frame also serves as a heat radiating plate, resulting in further effective heat radiation. These novel and advantageous configurations also are not shown or suggested in Haan.

Claim 8 sets forth an embodiment of an arrangement to mount an inverter, such as shown in Fig. 9, to obtain air flow relative to the inverter. The features of this claim also are not shown or suggested in Haan.

Claims 1-8 define novel and advantageous structure not shown or suggested in Haan. Therefore, all of these claims should be allowable.

Independent claim 9 is directed to a device of the type shown in Figs. 13, 15 and 16. In the PV apparatus according to these Figures, a plurality of PV modules are mounted so that they have parts that overlap each other, like a staircase, and there is an air flow path for cooling an inverter provided between the PV modules. These air flow paths provide air to the inverters and improves the efficiency of heat radiation by the inverters.

Claims 11 and 12 read on Figs. 11 and 12; claims 13 and 14 read on Fig. 14; claims 15-17 read on Fig. 17; claims 18 and 19 read on Figs. 18-25 and claim 20 reads on Figs. 26 and 27.

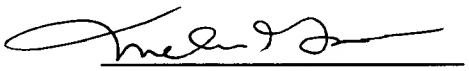
The invention, as set forth in claims 9-20, provides embodiments to mount an inverter as shown in the various Figures in order to improve heat radiation by an inverter, and various embodiments to mount an inverter to achieve

the improved heat radiation. Every embodiment for mounting an inverter has distinctive advantageous effects. Haan does not teach any means for mounting an inverter to avoid PV heat effects, let alone any of the specific novel and advantageous embodiments of mounting as set forth in these claims. Therefore, all of claims 9-20 should be allowed.

The other art has been considered and is not deemed to be pertinent.

Prompt and favorable action is requested.

Respectfully submitted,



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